

JULY 3, 1950

AVIATION WEEK

John Casey at Chicago knows!

Chicago's big Midway Airport is one of the busiest in the world. And John A. Casey, its manager, is a leader in progressive airport operation. He knows how important it is to avoid delays in landing and take-offs. Mr. Casey says: "The installation of the high intensity runway lights at Chicago Midway Airport in 1948 was the 'missing link' in the completion of the chain of landing aids used under conditions of restricted visibility. The high intensity runway lights are a perfect implementation of the ILS and GCA. All comment has been extremely favorable, with not one complaint."



H. C. Wright at Nashville knows!

When you ask the men who know, you'll invariably get an enthusiastic answer from H. C. Wright, the capable superintendent of Berry Field. "We've had some remarkable experiences here since we installed high intensity lights on our instrument runway, and their performance has been most gratifying to pilots and to the city. The controllable beam eliminates glare while taking full advantage of the high candle power. The lights are most definitely paying for themselves in improved operation and increased safety for ships and passengers. We are amazed at the unusually low operating cost of the high intensity lights. We've had three knocked down by incoming aircraft and they were reinstalled at a very nominal cost."

ask the men who KNOW L-M high intensity runway lighting!

● Airport managers, airline men, and pilots who use and know L-M High Intensity Runway Lighting can tell you from their own experiences, and from situations that they personally have observed, how important it is to have good lighting to delineate the runways in good weather or bad. Ask some of the men who know. Then ask the L-M Field Engineer for details, or write Airport Lighting Division, Line Material Co., East Stroudsburg, Pa. (a McGraw Electric Company Division).



LINE MATERIAL Airport Lighting

Hank Cross at Birmingham knows!

"When I was test flying B-29's here during the war and until 1949, the blackest area north and east of the city from the air was the municipal airport. The mountains and smog conditions peculiar to Jones Valley added to the problem," writes H. T. Cross, well-known Director of Aviation of Alabama's biggest municipal airport. "Last fall we installed high intensity lighting, all three runways. Airlines, pilots, and to operators are all most enthusiastic. Pilots are seeing the lights more than fifty miles away. Typical pilot's comment: 'Now I won't be trying to let down on the First Avenue street light instead of the runway!'"



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The designers of these airplanes chose the J-34 because it combines high power with low weight. These features plus the power, dependability and performance of the engine assure that the air striking force of the United States Navy will be second to none.

(J-340) 8

Westinghouse

**AVIATION
GAS TURBINES**



B.F. Goodrich



**It's rough on subs,
smooth on runways**

ARMED with electronic search equipment, plus torpedoes, rockets, cannons and machine guns, the Navy's Lockheed Neptune is designed to hunt down the fiercely under-proof 'steel' submarines. With all this equipment to carry, engineers had the problem of showing every possible pound of the plane's weight. When it came to the wheels and landing assembly, they turned to B. F. Goodrich.

B. F. Goodrich Explorer Tube Brakes can be designed lighter for a given amount of kinetic energy than any other brake. The new spoke-type frame is both lighter and stronger. The

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As a result, the B. F. Goodrich assembly on the Lockheed F1V-4 saves considerable weight over other designs. And it provides smoother, safer take-offs and landings. BFG brakes cannot lock or grab. They spread smoothly and quickly to maximum pressure. They take emergency overloads better.

BFG brakes also increase plane availability. There's less waiting time for replacement and repair. Rebuilding jobs

can be handled with a screwdriver and wrench. Wear on all parts is slower because the load is evenly distributed.

The main wheels and nosewheel on the Neptune are equipped with B. F. Goodrich tires and tubes for maximum safety and economy. The complete B. F. Goodrich wheel assembly is one of many effective solutions to aviation problems patented by B. F. Goodrich research. The B. F. Goodrich Co., Aeronautical Div., Akron, Ohio.

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Aviation Week

Volume 53

July 3, 1950

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Robert F. Rogers

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TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

News Picture Highlights...

SO-M2 RESEARCH PLANE

France's sleek Sud-Ouest M2 (right) is a military research type for investigating some flight problems and also serves as a flying "model" for the proposed SO-600 twin-engine general bomber. The M2 has a Dornier Landing gear consists of three main wheels in tandem, single nosewheel, and catapult, all retractable. Sweep wings have slots. The M2 has attained a speed of 1800 km./hr. (AVIATION WEEK June 26) without encountering compressibility difficulties.



VAY-VISCOUNT MAKES DEBUT

First British plane to be powered by Rolls-Royce Tyne in the first of two modified Vickers Viscount (left) which has started flight tests. The modification was ordered by the Ministry of Supply to try out the Tyne engine, which is a most powerful development of the Nene. Thus far no other installation of Tyne engines in British planes is contemplated, and evaluation of the engine will not be put into large scale production.

BRISTOL 171 IN PRODUCTION

The Bristol 171 helicopter (right) is the first British-designed rotor to go into production, although it is not commercially available. A military version will be in a research vehicle for development of the larger Bristol 173 twin-engine design. Of the production models, one Model 171 will be used by British European Airways for operational tests, and the other will be delivered to the Ministry of Supply for testing by the Airborne Forces Experimental Establishment.

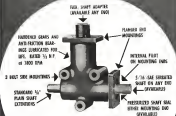


RAF FLYING CIRCUS

A trio of RAF Shetland B.C. helicopters (left) touched up by a skilled workshop crew to assemble the variable pitch mechanism complete with trunks, eyes and ears go through three passes at the labor of a virtuoso perfect "responses." They are performing a stunt routine at preparation for the RAF show at Farnborough this week. Is there anything a helicopter can't do?

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AVIATION CALENDAR

July 7-8-Royal Air Force 1950 display, Farnborough airfield, England.

July 10-12-Air Age Institute lecture series, Santa Ana College, E. St. Louis, Ill.

July 12-14-General assembly meeting of the Institute of Aeronautical Sciences outside headquarters building, Los Angeles.

July 14-16-National meet. on airt., including a weekend airplane racing day, sponsored by Chattanooga Flyin' Club, Chattanooga.

July 16-First efficiency meet. and show, sponsored by Mansfield Aviation Club, Mansfield, O.

July 21-24-7th annual all-Ohio air fair, sponsored by Cleveland Junior Chamber of Commerce.

Aug. 2-15-17th National Science Contest, Grand Prairie, Texas.

Aug. 5-Leam 12th Air Meet, Sky Palace Airport, Goddards, Ontario, Canada.

Aug. 7-11-Special network program on high temperature engines, Massachusetts Institute of Technology, Cambridge, Mass.

Aug. 12-15-First United States International Fly-In, Chicago.

Aug. 18-Tennessee air program conference, Knoxville.

Aug. 19-20-California Air Flight Club, sponsored by California General Aviation and Oakland Chapter of Commerce Aviation Committee, Oakland.

Aug. 20-21-Fourth annual Air Force Association convention, Hazy Station, Baltimore, Md.

Sept. 5-10-Eleventh flying display and air festival, Society of British Aircraft Constructors, Farnborough airfield, England.

Sept. 7-First & Whittier distributor operation and maintenance meeting, Pacific Northwest Corp., Everett, N. J.

Sept. 9-10-Third annual convention of the California Wing of the Air Force Association, Arrowhead Springs Hotel and Spa resort, San Francisco, Calif.

Sept. 10-11-Sixtieth Society of Aeronautics annual conference and national exhibit, the Coliseum, Houston, Tex.

Sept. 12-14-Conference on physical facilities for air transportation, Massachusetts Institute of Technology, Cambridge, Mass.

Sept. 15-22-Fiftieth national aeronautics show, Greater Montreal Aviation Show, Beloeil, N. Y.

Sept. 15-24-14th annual convention of the International Northwest Aviation Council, Rex Villa, Idaho.

Oct. 12-15-1950 conference on airport management and operations, Max Westheimer Field, North Campus, University of Oklahoma, Norman, Okla.

Oct. 16-18-1950 annual general meeting of the International Air Transport Association, Fairmont Hotel, San Francisco.

Oct. 26-27-10th annual aviation conference sponsored by aviation committees of Tus. Soc. Chapter of Commerce.

PICTURE CREDITS

12-McCormack, 13-World Press, 14-World Press, 15-World Press, 16-World Press, 17-18-BAACA, 19-Blackburn & Smith's Air Craft Ltd.

NEWS DIGEST

DOMESTIC

Howard Hughes' goal 308-17 [repeated] might also have been his [repeated] first 12 during general test of its 1350-hp atomic blades. USAF has selected no information as to the cause of the accident or extent of damage.

The National Air Council transferred its quarters from New York to Washington, D. C. to facilitate its dealings with government agencies, national groups and aviation associations. New address is Suite 615, Dupont Circle Building, 1346 Connecticut Ave., NW, Washington 6, D. C. Telephone number is North 2718.

Northwest Airlines' Air Coach DC-4 crashed into Lake Michigan June 24 killing all 55 passengers and crew of three. It was the airline's worst air disaster. Plane captain's last report stated that the DC-4 had encountered a severe electrical storm and high velocity winds. The plane left New York and was en route to Minneapolis.

National Airlines is considering a daytime New York-Los Angeles DC-4 coach service at 41 cents a mile fare. It would complement present night DC-4 coach flights which have 50 cents-a-mile rate.

Boeing's \$8,000,000 suit against the Aero-Mechanics Union and International Union of Machinery has been dismissed in Seattle federal district court. But the company will appeal to the U. S. Circuit Court of Appeals. Boeing filed drawings for the 140-day strike conducted by Aero-Mechanics at its Seattle plant in 1948, but the court agreed with earlier rulings that although the strike was illegal, the company lost its right to sue when it acceded to its contract with the union on the spot day of the strike. UAW was held blameless since it did not sell the suit and did not authorize the strike until six days after it started.

Maj. Gen. Roger M. Reiser left his command of the Eighth Air Force to become director of operations at Air Force headquarters in Washington, D. C. Maj. Gen. Samuel E. Anderson is taking over Reiser's former post.

An RAF night fighter team will be assigned to Aeroflot, Fleet Marine Force, Alaska, Cherry Point, N. C., in part of the intensive exchange policy to transmute various services with each other's activities.

Continued leasing of space at U. S. military airports for use by private contract agencies is planned. Under the new setup, the General Services Administration would coordinate needs of various agencies during space at these installations and arrange "single prototype" contracts with each agency.

Charles Lester Lawrence, aviation pioneer and inventor, died at his home in Middleburg, N. Y., June 24. He was 64 years old. He was last known for his development of the famed Wright Whirlwind engine. Lawrence headed Wright Aero Corp. from 1923 to 1934 and was its president from 1935 to 1941. He was General Lawrence Engineering and Research Corp. He was president of the Aeronautical Chapter of Commerce in 1931 and 1932 and head of the Institute of Aeronautical Sciences in 1933-1934.

Second North American A-1 attack bomber exploded in the air last week near Redwood, Va., killing its three crewmen. The plane, en route from Edwards AFB (Waco) Calif. to Fort Belvoir Air Station, Md., on its first reconnaissance test hop crashed in flames about 50 miles from the goal. The plane was powered by two Pratt & Whitney R-3600 14-cyl. engines and was A-1A-155. Debris of crash are still undiscovered. A search airplane last week delayed the first A-1 during a test flight on the West Coast.

INTERNATIONAL

U. S. Spanish air transport agreement has been amended to give Spain two transatlantic routes from Spain to San Juan, Puerto Rico, and Caracas, Venezuela, via Mexico, the Azores and Bermuda, and from Spain to Miami, Mexico, Havana, Caribbean and South American ports via Mexico, the Azores and Bermuda. The U. S. has two routes through Spain.

W. H. Moss, British light aircraft designer and builder, was killed when the Mosquito he was piloting in the King's Cup Race crashed during a piston turn. He was 46 years old.

Turnover of Airline Transactions handled by the International Air Transport Association clearing house during April was \$13,787,809, an increase of over 52 million compared with the same month last year. Quarterly transactions were \$3,693,000, the first four months of 1950 compared with \$45,371,000 for the same period in 1949.



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WHO'S WHERE

Changes

Charles French, chief engineer of Easton Air Lines, has replaced William Littlewood as a member of the Committee on Automation of the Research and Development Board, Dept. of Defense. Littlewood, representing for American Airlines, is reported here the committee because of its size.

Averell E. Adams has been named into manager of Eastern Aircraft Service, Woodside, N. Y., and Al Leisner has been appointed branch manager of Woodside, Long Island. Harold Street has been made vice president manager, with John Boyle named as vice head of the purchasing dept. of Woodside, N. Y.

W. W. (Coff) Stevens has joined Glenn L. Martin Co. as public relations staff. Earl F. Lutz has been appointed chief product engineer of the Republic Co.'s California Investment division. Charles D. Finner, formerly technical vice president of the National Air Council, has been named executive vice president.

Honors and Elections



IT'S NOW "DOC" GREENMAN—LeRoy Knutson Greenman, chief executive of Greenman Engineering Corp., takes hold of his new honorary degree of Doctor of Engineering from Ex. II, S. Rogers, president of Polytechnic Institute of Brooklyn (right).

Robert F. Knox, engineering manager of the Westinghouse system gas turbine division has been awarded the Spirit of St. Louis medal of the American Society of Mechanical Engineers for "leadership in the development of the first American design of a turbojet propelled for aviation service."

I. W. Bushman, II, and Frederick F. Robinson have been elected to the board of Goetz Hydramics.

Leonard S. Hinkley, Northwest Airlines, has been elected chairman of the International Air Transport Association's committee.

INDUSTRY OBSERVER

Capital Airlines has obtained CAA approval on the modification in its DC-3s of Wright R-1820 G2B engines in place of R-1820 G1B without major rework to the engine block or carburetor, and without installation of cowl flaps. Elimination of the extra weight will save Capital more than \$500,000 over a three-year period, as the airline has needed a small chance to Ralph Howell, its engineer who is responsible for the change. Key to the approval is restriction of takeoff horsepower of the new engines to 1100 hp., but Capital, like other DC-3 operators, obtains an additional 50 hp. at cruise settings.

The so-called "grass roots" frequency for private pilots has received RTCA approval. Special Committee 16 usually reported, however, that 122.8 mc. is the only frequency available and some concern was expressed about the lack of frequency in the 122.0 to 122.0. The fact that while the radio dial shows 122.0 at high limit, the radio actually reaches 122.8. While private pilots usually fail to put the channel to standard use, POC is expected to take a minimum of two months to clear frequency for general usage.

Definite steps to enter the world market with a transcontinental jet transport have been taken by A. V. Roe Canada, Ltd., Toronto. Montreal is the company will be an interesting footnote in business and aviation developments in Canada, U. S., Europe, South America, Great Britain, Australia and New Zealand. Four advertisements are planned which will stress "more passenger-faster airplanes," "supplies passenger-related costs," "lower maintenance-higher profits," and "high serviceability-low maintenance."

First use of postwar non-American equipment as a scheduled Berlin-aire airline began the month with Varig Aereo San Paulo S. A. (VASP) placing a SAAB "Scania" in service on the Rio-Sao Paulo run. The Scania (three have been ordered) will do the 210 mile run on exactly an hour. This rate 40 minutes from the three now required by Douglas "Dakota" transports used by VASP and the half-hour other lines flying Brazil's most remunerative route.

"Swede" Golden, Ethiopian Airlines, Inc., executive, is in the United States negotiating for purchase of two Cessna-440s. Purchase is being arranged through Floyd Gilman's Aircraft, Inc. Consolidated Airlines turned over 15 Cessna-440s to Ethiopian Airlines about a year ago and the Ethiopian side represents the first business of Ethiopia. The Ethiopian line currently is flying six Douglas "Dakota" transports and one single-engine Cessna-440, Newmarket, Newmarket, and 40/50 route miles between Addis Ababa, Cairo, Nairobi, Amman, Beersheva and Tel-Aviv.

Capital Airlines has made three major modifications to Air Star down to its DC-3 in an effort to eliminate the possibility of crashes. It has in flight (between Wings, Feb. 25) as has occurred at least twice. Revised counts of installation of spring to help in ball shock and increase the effort required to move back, reduction of type of winging finger, and removing a spout block to increase bearing surface between finger and door sill attachment points.

Australia is setting up its air industry for conversion to jet aircraft manufacture, and plans to start at once by end of 1950. Already in production with an order for 50 planes, the Harland Vampire single-place Mk. 50 fighter-bomber. Plans is provided by Rolls-Royce No. 4 developing 500-hp. short. Second phase scheduled for Australian production at the Hawker N.7/46. Also provided by a No. 4, the plane is a single-place fighter designed primarily for shipboard operation.

While the French aircraft industry will continue developing prototype and military aircraft of all types, preliminary agreements signed between agents of the State Aviation that are that France will concentrate its production of lighter types exclusively and will be responsible for developing transportation tactics for Western European Defense.

lance Commencement early in 1946.
•Four Types Considered—So far, only the four types of jet lighter planes are under consideration for equipment at MDAF national. If the program is approved, they will be produced in quantity to be added to the rest of U.S. production aircraft in foreign service.

The Lockheed P-80B is armed with six 20-caliber machine guns firing 1200 rounds per second per gun. Span is 35 ft 10 1/2 in, length, 34 ft 6 in., height, 11 ft 4 in. Weight empty, 6230 lb., loaded 15,000 lb., speed, 605 mph, ceiling, 46,000 ft., range 1100 mi. 240 to 300 flights were ordered by USAF in 1947.

The Republic P-48D is armed with six 20-caliber machine guns and eight 148-lb. rockets. Span is 37 ft. 5 in., length, 34 ft. 5 in., height, 12 ft. 10 1/2 in. Weight empty, 6155 lb., loaded, 12,881 lb. Speed is 50,000 ft. 570 mph. Ceiling is over 45,000 ft. and range is 1700 mi.

The Chance Vought P-51 is armed with four 30-caliber machine guns. Span is 37 ft. 4 in., length, 33 ft. 7 in., height, 11 ft. 9 in. Empty weight is 7550 lb., loaded, 21,300 lb. and service ceiling is 58,000 ft.

The North American P-51 is armed with six 30-caliber machine guns. Span is 35 ft 11 in., length 33 ft. 7 in., height, 14 ft 6 in. Gross weight is 12,000 lb. max. speed is 550 mi/h and range with drop tanks is 1950 mi.

National Air Races Put Off Until 1951

Flat refusal of Defense Secretary Johnson to permit military aircraft to fly in the National Air Races has forced postponement of the 20-year-old classic from the Labor Day weekend to Armed Forces Day in May, 1951.

Johnson, in reply to Air Race President Frederick Crawford's "annual invitation" to the armed forces (Aviation Week June 7), declared that reasons of economy and defense policy had no approval for participation of military personnel and aircraft in the show. He said further that all demonstrations of military prowess—Army, Navy and Air Force—must be held on the grounds of the Armed Forces Day only.

Crawford, after failing in his efforts to get Johnson to reconsider the ban, in a bold stroke of strategy declared that the most important war-torn forces were "in the air," "It is hoped," he said, "that the coming day will make possible the complete reoperation of the Armed Forces so that the units may be assigned to Cleveland's air event in conjunction with the celebration of the nation's birthday."

Military participation in the race at Cleveland's Municipal Airport ended

just as abruptly has been the main drawing card of the event, which, though the years has assumed international importance. If Johnson fails to permit military aircraft permission to fly at Cleveland next Armed Forces Day it might well spell the end of the annual classic.

There has been a notable lack of interest during the last three years as the part of the air industry as well as the military in the race. The danger of crash of military aircraft performing at high speeds before crowds of thousands of air enthusiasts has long been a headache to the industry concerned with keeping its product low-key in the public eye. The military, similarly, is doubtful of the value of publicity in the air forces and even more doubtful of the "marketing value."

Concededly, however, announced a new plan for the race. The Bendix Trophy Race, a transcontinental speed dash, and the Thompson Trophy Race, a speed dash around points, are to be continued to get interest. The Continental Trophy Race will remain open, he said, to light planes flying around points in view of the ground race.

The Defense Department insisted again on Crawford's plan for military participation in next year's National Air Races.

Northrop X-4 Ready For Transonic Test

An NACA test pilot will soon begin exploratory flight test probes into the unknown transonic speed range of flight, probing the Northrop X-4 research plane.

The pilot, John H. Coffey, who flew 130 missions in USAF fighters in World War II, was recently assigned to conduct the program's new research mission to take place at Edwards AFB, Calif.

Paid to Coffey's starting his program, Capt. Charles E. Yeager, world's

fast supersonic pilot (Aviation Week Dec. 12, 1947), will do approximately 10 hours of speed preliminary tests for the Air Force. The NACA pilot will then begin his exploratory, equipped with data supplied by Capt. Yeager and Northrop test pilot Charles Tucker, from earlier flights.

The tiny supersonic X-4 is designed to fly at the speed range around the 550-mph mark, just below the speed of sound at sea level to determine flight phenomena in this speed region.

Thus have 25 ft. wing span, and are about 28 ft. long. Controls are Northrop elevator-combination ailerons and elevators and the planes have no horizontal stabilizers or elevators, only a vertical stabilizer and rudder. Power plants for each plane are two Westinghouse 10X6103 engines of 1600 hp thrust power only.

First Gen. Al Boyd, commanding officer at Edwards AFB, announced that the X-4 had completed their acceptance tests after 16 months of preliminary flying and other testing by Northrop crews.

Guided Missile Test Centers Realigned

In an effort to get down missile research and development costs (Aviation Week April 30), Secretary Johnson has ordered that management for the armed services' three major guided-missile test centers each move under the jurisdiction of a single service.

Under the order the Joint Long Range Proving Ground at Beaufort, N.C., becomes the USAF Long Range Proving Ground Division. Originally it was planned for this test center to operate under the direction of the Joint Chiefs of Staff with the USAF as executive agent.

Holloman AFB, Alamogordo, N. M., is transferred to the Army which will be responsible for both the White Sands Proving Ground and the adja-

cent Holloman base. Navy will continue operations at Point Mugu, Calif.

Reorganization of management was said officially to "promote efficiency and economy."

Rail purposes involved in the recent designation of command in the field.

•To halt interference blocking at to duplicating research.

•To determine which service would actually test rather than the most out of budgetary efficiency of funds.

ATA Buys Flight Recorders for Tests

The Air Transport Association recently purchased 24 flight recorders for test per piece at a total cost of \$45,000.

General Electric, Hawthorne and General Instruments, Inc., each supplied eight instruments. They are installed on aircraft of 16 airlines participating in the test.

The instruments are of the electrically driven, continuous recording type. They record altitude and vertical G acceleration.

They are centered in the tail of the aircraft where chances of becoming intact in case of a crash are best.

At Dallas of ATA told Aviation Week that the purpose of the tests is to determine the instruments' reliability. The FAA does not now require the use of flight recorders.

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Minimum Wage: Industry Lesson

Determination for aircraft workers shows Business the danger of wage increases by administrative action.

By Harold Modley

The aircraft minimum wage case which led to the setting of \$4.05 as the minimum wage for the aircraft industry has given management a shock which promises to have far-reaching working far beyond this industry.

•It has awakened other industries to the threat of wage increases by administrative actions, through the present investigation of the Walsh-Henley Act by the Secretary of Labor.

•It has drawn more sharply than ever before the battle lines between the secretary as one labor and industry on the other.

Many industry representatives tend to identify labor's position with that of the secretary. While this is generally correct, the following quotation from "a public relation in defense of freedom of labor," shows the beginning of doubt in labor's ranks on activities such as the secretary's.

"Labor does not choose to have its welfare determined by the administrative action of government officials no matter how well intentioned they may purport to be" (AFI, Electrical Workers statement on Public Ownership, May 21, 1950.)

•It has brought into sharp focus the fact that the secretary intends to define what is "prevailing minimum wage" and that he clothes his determination with such obscure and vague language that he has to defend himself against charges of "arbitrary" determination.

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Harold Modley is President of Executive Research, Inc., a consultant at the Aircraft Industries Association since 1944, he helped prepare the industry's minimum wage case. He now is working on the minimum wage case of the office machine industry. Dr. Modley recently completed a two year assignment as special consultant to the Comptroller of the U.S. Air Force and has been a Consultant of the War, Labor, and Agriculture Departments, the War Production Board, and other government agencies. He is a member of the President's Labor-Industry Relations Committee of the National Management Council, and Industry Representative on the National Working Group of the Air Conditioning Council.

The views expressed in this article are his own and should not be interpreted as those of the agency with which he is connected.—Ed.

Nobody has ever been able to figure out if the term "in the line" is meant to apply to all line divisions or only to the line. The "line of the law" actually goes little or no goods.

•Administration—The Labor department relies on the second alternative, the views "in the line" as the only viable one. Occasionally it takes into account "locality," giving the word so broad an application that it may mean more than three "localities" in the entire United States.

In the administrative process the word "minimum" has undergone an even more amazing metamorphosis than the word "line." In its most deconstruction, the secretary based his finding of the "minimum" on a survey of straight time hourly earnings for all workers, regardless of skill and advancement, instead of considering minimum rates in the only true rate scale "Mezzanine" which, therefore, determined on the basis of survey which include workers at the minimum of the rate range.

While the secretary's minimum is "upheld to workers," (possibly would have at least a time to argue before a minimum wage paid or being in industry does.

Whether the Secretary of Labor agrees in their definition of the term



XF-96A IN FIRST FLIGHT

Republic's new supersonic version of the P-54, the XF-96A, pitched at the Air Force got it through its initial flight tests at Edwards AFB, Calif. Power is

provided by Allison J35-25 turbojet engine. Ground photos of the XF-96A appear in AVIATION WEEK May 15 (p. 17).



RAIDER'S VERSATILE "FEET"

Northrop's C-425 Raider transport incorporates a new landing gear design that allows the craft to be switched from wheels to skids which is a feature of amphibious

"prevailing." Yet, the issue is applied in a way which denies logical analysis. Thus, we find ourselves in a wasteland in which the United States is a "loser" to a "winner" or "non-winner," and all kinds of percentages pay up on "prevailing."

► **Just a Month-Yet**, the cost must be clearly stated for the employer who is to pay for the defense. Determinations which are reported to Congress as "standard practices" have a tendency to affect a large percentage of all plants and to bring about wage increases for a substantial percentage of all workers. Where the cost of such increases could lead to new declassification, which in turn might lead to new wage increases—and so on, in a never ending helter-skelter spiral.

This is of special importance to the aircraft industry because it is probably the only industry in which a declassification not only offers an opportunity for cost-cutting, even but also presents the possibility of increasing its earnings as long as the Walsh-Hesley Act is in effect. Even if wages in industry not engaged in government work should ever go back to 1946 levels, the aircraft industry will remain unaffected by any such change.

This is not because practically the entire industry works for the government and has to adhere to the maximum as a rule act. The cost to the government in case of such a decline from 1946 wages has been estimated at about \$70 million per year in wage differentials. From today's wage levels it would be even greater.

► **No Legal Recourse**—In spite of the weaknesses of the law these costs to be no legal recourse against declassification. In spite of the weakness in the administrative procedures, those costs to be no recourse against the government. The Administrative Procedures Act does not apply to the Walsh-Hesley Act. All this because, at the moment this is the stretch definition, "it must be borne in mind that the declassification apply only when employer or subcontractor themselves on a voluntary contractual basis."

On the other hand, if you don't like it, you don't pay it to the U.S. government, who don't pay it to the AAF.

► **What Not-Industry** feels that the terms of the Walsh-Hesley Act have been fully accomplished. It holds that when the Act was passed, the danger of 1916 there was a real danger that sweetheart conditions might return to plague labor and the employers alike. The NLRB had been reported that when the Act was passed, the danger of 1916 there was a real danger that sweetheart conditions might return to plague labor and the employers alike. The NLRB had been reported that when the Act was passed, the danger of 1916 there was a real danger that sweetheart conditions might return to plague labor and the employers alike.

The broad assertion of labor since 1916 and the passage of the Fair Labor Standards Act per se cannot that such

ships are gone for good. Industry holds therefore that the Walsh-Hesley Act is unnecessary and that its present use as a vehicle for wage increases is against the spirit of the law.

Industry opinion is opposed by the Department of Labor which holds that it is the policy of the Congress in enacting the Public Contract Act to prevent government business from going to laborers with wage practices which are substandard for the particular industry. The department holds that it must continue to eliminate such "unfair practices" so long as the law is in effect.

Only the Congress can decide this conflict. But as long as the Walsh-Hesley Act is one of the laws of the land all those interested in good government should put all possible pressure on the secretary to announce clearly and unequivocally the factors on which he bases his determination.

The action of the secretary from assistance in decisions and experience, these factors could and should be developed through a post government-industry labor contract working under the auspices of an impartial authority. According to the law, the same criterion could be used to develop proper definition of "locality" and "maximum" and to establish guidelines for determining when a maximum "prevails."

Munitions Board Reorganized

The Munitions Board has been reorganized. New plan assigns all offices having primarily industrial aspects under a Director of Production Management, and offices with primarily military aspects under a Director of Supply Management.

The Production Management Directorate, scheduled to be headed by a civilian, "will have industrial character," it is currently headed by Maj. Gen. A. B. Quisenberry, USA. He will be given military advice to the new civilian head.

Offices now included under Production Management are: Production planning, materials, construction, and manpower. Security of the Munitions Board on aircraft, petroleum and electronics. Also, the division of the newly created division of Production Management.

The post of director of military supply is abolished. Rear Adm. Martin I. King, USN, who had been director of military supply, has been transferred to supply management. He will receive office of procurement methods, office of distribution methods, and the steel

and, automobile, inspection, and extending agencies.

Reorg. Gen. E. G. Langford, USAF, former director for military programs, is now in charge of the division. The reorganization becomes another director of the staff.

Silvaire Deliveries

Lescage, a setting up its Delta production lines to handle a lot rate of 50 Silvertans and is scheduling deliveries to begin next month.

Initial output will be confined to 200 Silvertans, which will be 90 hp Silvertans. Delta, priced at \$3665 f.o.b., and a stripped Economy Silvertan, at \$2615 f.o.b., for which the customer will furnish his own engine. Both models will have 140 hp and a new wing engine mounted in standard equipment.

► **Flow Kit**—The company is making a new flow kit available to owners of existing Silvertans. Price is given as \$250. The kit includes a complete set of plans will permit the following performance: 13 mph, power-on stalling speed (at 5100 rpm) reduction from 100 mph, and ability to land in 150 ft. or less on a 25 ft. obstacle. Engines are based on a plant gross weight of 1400 lb.

The newly reorganized firm (Aviation West Inc.) still considers the four-place Silvertan as a top action product. But because of reorganization, the firm is now a plant gross weight of 1400 lb.

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Airframe Shipments

Shipments of complete aircraft, components, and engine parts, amounted to \$15,154,000 in April, 1950, according to the Bureau of Census and Civil Aeronautics Administration. U.S. military procurement accounted for 99 percent of the total volume.

Airframe shipments of civil aircraft amounted to 329 planes valued at \$6.4 million compared with March shipment of 325 aircraft valued at \$5.7 million. The report covers 16 aircraft companies operating 41 plants and 17 major companies presently operating 14 plants.

Aircraft engines shipped in April totaled 4,115,000 hp., with military government accounting for 96 percent of that total.

Airplane shipments of 164,995 general aviation aircraft were slightly higher than the 162,846 registered in March. April airplane shipments to military government accounted for 96 percent of that total. The report covers 16 aircraft companies operating 41 plants and 17 major companies presently operating 14 plants.

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MILITARY CONTRACTS

AF Contracts Total \$240 Million

Air Force contracts for fiscal 1950, totaling \$240 million, were awarded to 100 contractors.

The Air Force awarded contracts in April totaling more than \$240 million for fiscal 1950. The largest single contract, for the development of a new aircraft engine, was awarded to Pratt & Whitney.

Following is a partial list of April Air Force contracts. Other lists will appear in subsequent issues. The estimated completion dates of the contracts are given where available.

American Aircraft Corp., Chicago, Ill., \$100,000, for the development of a new aircraft engine, to be completed by June 1951.

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AERONAUTICAL ENGINEERING

Aero Progress Challenges the Engineer

- In the last few years, the science of flight with its research and design ramifications has accelerated to such a startling pace that the remarkable progress of aeronautics' first decades pales by comparison.
- For the rank and file of aviation technicians and those entering the field, this new era presents a pointed challenge: To keep abreast of the rapidly accumulating knowledge so that new complexities can be resolved for sound application to practical design.
- Interdependence of groups in research and in design and the ever closer relation of these two activities means that the engineer must extend his knowledge into the field of his co-technician.

By C. E. Pappas*

The brief span of aerospace flight has added to the aeronautical engineer's "toolkit" a new lot of complexities, with growing gaps between what has been considered basic knowledge and concepts comparatively new to the field.

Aeronautical engineering has never been a "handbook" science. It will continue to present ever-increasing challenges, testing the imagination and requiring a keen ability to apply newer knowledge to practical designs.

Since the field of aeronautics is ever-changing and fast-moving enough as a specialty in its many domains, Chief among these are:

- Education
- Avionics
- Propulsion
- Structures
- Aerodynamics

The order in which these categories are mentioned is no way indicates their relative importance, but rather they are the "building blocks" of what must be an integrated, overall aeronautical foundation.

Education: The aeronautical engineer frequently finds himself unable to cope with the newer concepts that high-speed flight has brought. This voids area because basic training in mathematics, physics, chemistry and many other key branches are notoriously lacking to meet the rigorous demands of the complexity of aeronautical problems.

This deficiency already has been noted in industry and there is no in-

creasing trend to have men possessing what was formerly considered "abstract knowledge." These personnel include mathematical and static physicists, physical chemists, and even astronauts.

There is a need for reevaluation of education in preparation for the aviation industry. With the unfolding ramifications of the aerospace future, technicians now cannot do the aeronautical engineer's job with a "limited specialty," that has been training before entering industry should be along lines of general sciences.

Then, they must, will consider him as "fully aware" "flexible" in the general aeronautical picture. Though there is growing evidence of specialization—over within specialization—a "broadly educated" engineer will have a broader appreciation of problems related to his specialty.

It will be argued that a person who has acquired such fundamental or "background" training may become so involved in one or two details that he will forget the practical application of his science to a particular problem. This can be overcome to a large extent if, after four years of training in the basic subjects, he is subjected to actual engineering problems in various fields in his fifth year.

Then, of course, advocates a five-year training program in place of the customary four-year course but this additional year is necessary for the student to gain an appreciation and repeat the required balance of judgment between science per se and the application of it to a specific problem.

And, in industry, frequent intergroup training within the plant to increase overall flexibility and build the

ment of the engineer will undoubtedly be a "must" in the aeronautical future.

Avionics: The great field of electronics, as applied to aircraft, has progressed so rapidly within the last decade that its advance has far outstripped the efforts of the average engineer to keep up with it.

This is a condition which can seriously affect design progress. It can no longer be ignored, because basic design of the aircraft is a function of the capabilities of the electronic equipment and vice versa.

Hence, the aircraft manufacturer must simultaneously coordinate the activities of the development of electronic equipment with the aerodynamic characteristics of the plane, to achieve greatest practical utility.

This means that design personnel must have more than just a superficial knowledge of electronics and its application potential.

High speed alone is increasing less for constant craft unless equipment cannot be made to supplement this characteristic effectively. A pilot flying at high speed is confronted with a task of choice in great, that he will be able to place the target in his sights. Without equipment to give him accurate sensor wiring, his speed advantage will prove of no practical value.

Also, electronics and laser design of sophisticated control must be tied together in such a manner that the design engineer must have a clear knowledge of electronics as well as mechanical systems in the high speed regime where communications, mechanical reception of signals will be a prime factor. This will be necessary to cope with malfunctioning of highly intricate devices at the possibility of enemy planes.

Since the degree of simplicity and responsiveness required for electronic equipment will depend upon the type of the service, the design engineer will need more than just a familiarity with their electronic devices to coordinate intelligently basic control problems with the engine output.

Powerplant vs. Airframe: Does engine development lag aerodynamic progress, or vice versa? This controversy is particularly in accordance with the increasing demands for thrust at their kilowatts opposing camps.

The engine designers took the air-

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T-33 JET TRAINER

The Lockheed Aircraft Corporation, largest producer of jet aircraft in the world, has built almost as many jet airplanes as all other U.S. manufacturers combined. In fact, Lockheed has built jets at the rate of more than one a day—every day for more than four years.

Representatives of the Lockheed jet family is the two-place T-33 Jet Trainer (shown here), only jet trainer airplane built in America today (Martydingman, TCA). The dual-control airplane now trains more pilots for the supersonic fighter planes of the Army, the Navy and the Marine Corps.

The experience obtained in the design, development and manufacture of jet fighter planes is invaluable in the Lockheed laboratories where the designs of the future are being shaped today.

LOCKHEED

Aircraft Corporation, Burbank, California
Lock is Lockheed for Lockheed



from men by surprise when they added, almost overnight, approximately 100-300 mph. to the speed of what already were considered "hot" military aircraft.

But it was not long before the aerodynamic design complemented the new jet power with efficient and adequate landing and wing configurations.

Now, structural observers say—"This is where I count in."

The aerodynamicists still feel that jet does not answer the problem because of its size (particularly in the higher wing class), specific fuel consumption, and mass flow characteristics.

All these items make the aircraft much larger than subsonic aircraft designs. This in turn, creates a need for still larger power, and here we go around in circles again.

Academy officials maintain that if by an altitude of 40,000 ft. at a speed of $M = 1.5$, static sea level rating of the engine would be of the order of 50,000 lb. thrust. This means tremendous loads to carry the aircraft as it flies.

The engine men may answer that they never have seriously contemplated a jet engine of this power. They probably feel that the answer lies in a different type of powerplant—possibly a combination of jet and rocket or possibly rocket power. Though this latter power medium has demonstrated its potential in aircraft craft, much more must be learned about it operationally and its fuel consumption improved for combat service if its ability is to approach that of the engines in today's military craft.

While development of an "ideal" jet could go far to bridge the engine power gap, the situation now emphasizes that a better appreciation of engine problems is needed by the aerodynamicists and that the engine men must realize more fully the problems confronting the high-speed plane designer.

For today high speed designs, the knowledge of these two techniques must be recognized by exceptionally class leaders or in the form of a single specialist with extensive training in both fields. If conventional practice continues at the present tempo, this approach must be the necessary answer.

► **Structures**—Now problems are here to plague the structural analyst. There are not machine problems, but we require special techniques and more refined mathematical approaches, not generally considered previously.

Example: The delta wing presents new difficulties in that the chord and span are of comparable dimensions, and as such, the interdependence of these

two dimensional factors can no longer be neglected.

And special analysis is required to determine stress distributions at the root portion of a sweptback wing, since the concentrated stresses are longer in span. This has been checked in experiments showing that stresses at the root span were not uniform on the entire span that at least span.

Thicker skin gages will require more sensitive stress analysis. Here, the so-called secondary effects, such as the elastic restraint offered by spars and ribs and the interaction of these effects in delaying the general instability of the wing can usually be considered but in accurate prediction of ultimate strength.

The stresses in considerably different from the conventional thin skin structure where over-stretching is not used and the primary loads are not met by concentrated areas such as spar caps and stringers. With the thicker skins, the covering must carry the primary stress and compression.

The structural analysis of the thin winged aircraft is a science and a craft. The structural analysis of the aircraft is a science and a craft. The structural analysis of the aircraft is a science and a craft.

► **Thermodynamics**—Thermodynamics, aerodynamics, and aerodynamics will have the aerodynamicist to realize his thinking. Aerodynamics in these engines do not limit themselves to conventional solutions found in the subsonic case.

In the transonic field, the phenomena are, in a large extent, non-equivalent, and stability of the air flow shows an unstable trend. This implies that the changes in velocity as a function of Mach number are random in nature.

The engineers should, therefore, recognize that it is the fact that "hard science" must be used in this science and here he must give up the idea of precise determinations.

We now stand on a step of the new dynamic ladder, which will be described as "the way of probability." A concept of statistical average for the values to be used in analyzing the transonic phenomena is necessary because of the random nature that are involved.

The degree of randomness depends on a large extent on the initial conditions at a given Mach number. For example, if an airplane were flying in level flight at, say $M = .85$, and accelerated to $M = .95$, the pilot would

REGULAR *helicopters* carry weight, time and space when fastening structure

SPECIAL *helicopters* feature primary structure and provide attack means for removable elements



TYPICAL HI-SHAR carries primary structure. Rotor and tailboom are removable elements (shown separately) which attach means for removable elements



THE SPECIAL HI-SHAR also carries all primary structure. Rotor and tailboom are removable elements (shown separately) which attach means for removable elements



AVOID TRIP!

Elements attach, one each, to the main body. They are not attached to the main body.

other special HI-SHARS



Can... smooth shut... cross-sectional head... HI-SHAR down... these special HI-SHARS have several weight, time, space and cost advantages. They provide a new approach. They are simple... we will supply parts and complex

ST. LOUIS, MO. - 1960-1961

ST. LOUIS, MO. - 1960-1961

ST. LOUIS, MO. - 1960-1961

experience on the machine when he at the end point of this speed. However, if the airplane were to be destroyed from its initial equilibrium speed of $M = 30$ by executing a roll, the pilot's position would not necessarily be the same when he attained a speed of $M = 95$ as it is the level flight case.

Physicist's Approach—The notions of equilibrium and stability are not new in other sciences. The modern physicist treats most of his problems in the spirit of quantum mechanics along the theory of statistical distributions and probability. He has given up the notion of trying to specify his quantities precisely.

The modern experimentalist should adopt the philosophy of the modern physicist.

Hydrodynamic Factors—Problems are becoming more acute in which the aerodynamic engineer can no longer assume that the air is a continuum. This is because ultra-high speeds will be attained at very high altitudes where the mean free molecular path is appreciable when compared with the physical dimensions of the body, which is being through the medium.

As such, the laws of aerodynamics that are now in current use are not applicable for the design of future high speed vehicles, particularly in the case of missiles.

It is significant for today's aeronautical engineer to realize that to keep abreast of the field he must acquire a knowledge of some of the work of the modern physicist.

Such subjects as the theory of statistical gases, statistical thermodynamics and molecular structure must be ac-

quainted. These subjects need to be understood, for example, before any valid-point system can be obtained for the design of hypersonic tanks. Since the tunnel pressure approach an absolute vacuum, the gas is ionized. In this physical state, the ordinary thermo dynamic formulas do not apply.

And shock waves will require more critical analysis. Theories of the shock wave is actually small-of the order of the molecular free path. Since molecular distances are not negligible, the conventional thermodynamic equations do not apply. Molecules possess translational, rotational and vibrational degrees of freedom. Because of the extremely short time involved for molecules to transmit the wave, thermal equilibrium may not necessarily be achieved.

The translational and rotational degrees of freedom approach equilibrium very quickly in passing through the wave.

The change in vibrational mode occurs a finite time to attain statistical equilibrium. This is known as the relaxation time. Allowance for this relaxation must be made in the design equations when computing changes in pressure, density and entropy. This has not been usual practice.

These departures from conventional practice indicate, in a small measure, how complex is the field of aerodynamics have increased in scope.

New designs will involve application of many new concepts. And these new concepts will require a broader foundation with the many kinds of applied science.

Aeronautics is no longer a "specialized" study.



'TUFFY PULLER' SHAPES BOEING'S PARTS

Boeing rotary stretch lathe is now adding to Boeing Airplane Co.'s production line in Seattle. Fifty-ton machine has enough weight to stretch aluminum in tension and to its electric head, then move it into

desired position. Extended on rolled sections up to 12 ft. long can be wrapped around the mounted on revolving metal table. Boeing will machine in under 100 components. Builder is Cyril Bick Co.

Balsa Dust Shows Rotor Flow Geometry

Inexpensive apparatus is developed by NACA for helicopter research.

Balsa wood and a felt under have been combined by National Aeronautics Committee for Aeronautics to produce a new medium for the visualization of flow patterns around helicopter rotors.

Balsa, coated to a fine dust, provides highly reflective particles of low mass which can be introduced into an atmosphere for airflow observation. The technique, and its applications, was presented in a paper by M. K. Taylor of Langley Aeronautical Laboratory at the semi-annual meeting of the American Society of Mechanical Engineers at St. Louis, Mo.

After toying with a number of reflecting materials, including smoke, NACA found that finely-divided balsa particles gave the best combination of high reflectivity and low mass.

Balsa dust has a very porous background at it lies of a most-gain-sounding of select grade 1 balsa wood. The dust obtained is sifted twice through an 18-mesh screen.

Average free-fall velocity of these fine particles is about one ft. per sec.

Simple Apparatus—The equipment required for balsa dust flow-visualizations experiments is the dust, a camera, photographic lamp and some sort of disperser for the dust.

The NACA disperser is a narrow trough with a screened bottom, filled with balsa dust. The trough is mounted about four feet above the plane of the rotor, and is rotated mechanically to disperse the dust.

A plane of high intensity light from a number of photographic spotlights is projected normal to the line of sight of either a still camera or a motion picture camera. The camera, of course, is used to record the flow patterns.

Rotor Details—The model rotor tested in this group of experiments was single, round and laminar—a cross-section of today's practice. As near size of the rotor involved, the model rotor was 16 in. in diameter, and the blade arrangement, 45 in.

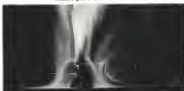
Plane of the rotor was about five ft. above the floor, for unimpeded ground effect, ground planes were set at either 25 percent or 50 percent of the rotor diameter below the rotor plane.

Test at Root-50 In, then, the NACA's balsa dust method has been used to determine the flow geometry around model helicopters similar to the rotor shown, versus under conditions of both steady and transient flow.



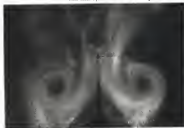
BALSA DUST

and spotlights define flow pattern around rotor in presence of standard ground 0.5HD below. NACA flow visualization.



METHOD SHOWS

rotor flow geometry of rotor under and tailing sections from blade tips of model rotor. Balsa particles visible.



FLOW GEOMETRY

resulting from rapid forward motion of model rotor. Dust is in water pattern circle with tailwind turn.

It has been possible to make measurements of the wake below rotor, to detect and record flow reversibility, to assess the effects of the ground plane on flow

patterns. And it has all been done with a simple technique and inexpensive apparatus.

Britain's Freighter Queen Makes Debut

Design is conventional, gross is 105,000 lbs., landing gear fixed.

Britain's top entry in the cargo air craft field, the Universal Freighter built by Blackburn & Croydon Aircraft Co., Ltd. has taken to the air for the first time.

This bulky craft is intended to fill the role of the standard medium-sized, conventional cargo plane of the British air fleet.

Tail Ramp—The Universal's configuration very generally follows that of the C-47 and Northrop freighters in this country, although it is much larger. It has no division with a massive, truck-like fuselage fitted with a loading ramp under the tail.

The Universal is Britain's first designed for the purpose of all-cargo plane of any size and cost. Its 105,000 lb. gross weight is twice that of the Bristol Freighter.

This weight, coupled with a 162-hp wing span, makes the Universal the second largest British transport, exceeded only by the Bristol Britannia eight-engine transport.

Design of the Universal is based on the need for 170-275 mph cruise speeds can carry up to 15 tons of cargo (21 tons useful load) at low cost over relatively short distances and get in and out of fairly tight places.

While the Universal is Britain's largest air freighter, it is small compared to the largest American cargo plane, the Consolidated Valiant XC-99 which, with a 265,000 lb. gross weight and 2100 hp, can carry a useful load of 65 tons over great distances at speeds reaching 300 mph.

At least two other U. S. aircraft currently designed to carry cargo, the Douglas C-124 Globemaster and Boeing Stearman, are well ahead of the Universal in speed, payload and range.

Fixed Freighter—However, it is possible the Universal may prove to have advantages in cargo loading ability. It also may excel in the simplicity of "bulk freighter," with its short landing and takeoff ability. And it has been designed to operate over rough road fields. "Inland run to clear a 50-ft obstacle is estimated to be less than 3000 ft. It is supposed to land over a 50-ft obstacle, in a little more than 1000 ft."

Mis-Indebtedness—S. thinking as cargo planes used to require two types of a standard high-capacity plane and a standard low-capacity plane. The British have the short land type in the Bristol Freighter. But the Universal is a new class—a medium payload, short-



UNIVERSAL FREIGHTER'S upper air and has integral ramp. With ramp down, it



UNOBSTRUCTED HOLD is easily loaded, accommodating vehicles, bulky cargo.

land plane—sit between the two categories formerly in this country.

The Universal's particular mission probably is to haul medium loads between front-line centers and points served by the small cargo craft.

Load and Range—is estimated, according to the BRAC Standard Method, the Universal will carry a payload of 15½ tons (28 m) at a cost of about 12 cents per mile, 11½ tons (20 m) at 11 cents per mile, 10½ tons (20 m) at 12 cents per mile, 9½ tons (20 m) at 13 cents per mile, and 7½ tons (17½ m) at 17½ cents per mile.

Loading rates as the craft are the main cargo hold, taking up the entire center section of the fuselage, a smaller compartment in the nose, below the cockpit, and additional space in the tail boom, in the rear seat above the main hold.

The main hold is 36 ft. long, 10 ft. wide, and 10 ft. high for the first 25 ft. from the forward end, with the remaining 10 ft. having a height of 15 ft.

Removable flooring with hinging is designed to support loads up to 275 lb./sq. ft. The main compartment is 15 ft. long and 6 ft. high. It has an amazing program for a loading vehicle. This can be assumed to take place in the main hold also.

The tail boom compartment has a cargo hold of 6 ft. and is fitted with a hatchway at the end and a 36 light cargo in being carried, a removable deck can be fitted in the rear section of the main hold. This arrangement gives an upper compartment of 15½ m in which will carry a maximum of 30 passengers.

Passport Convention—The Universal can be converted into a 90-passenger transport by adding seats for 60 persons in the main hold, three on one side, two on the other. In this case, baggage is stored in the nose compartment.

Passenger access to the upper deck is provided by a staircase at the forward end of the lower deck (main hold).

Freighter Data

Dimensions

Span	66.67 ft.
Length	90 ft. 2 in.
Wing area	353 sq. ft.
Wing span	2616 sq. ft.
Wing area	244 sq. ft.
Wing span	194 sq. ft.
Wing area	194 sq. ft.

Weights

Empty	66,670 lb.
Gross load	41,110 lb.
Gross weight	107,780 lb.
Minimum landing weight	100,000 lb.
Wing loading	38.1 lb./sq. ft.

Performance

Top speed	325 mph.
Top speed	325 mph.
Min. continuous cruising speed	12,000 ft.
Min. continuous cruising speed	12,000 ft.
Recommended cruise, two engines out	19 mph.
Rate of climb	620 ft./min.
Stalling speed, flaps up	75 mph.
Takeoff distance to clear 50 ft. obstacle	920 ft.
Landing distance to clear 50 ft. obstacle, reversible	700 ft.
Service ceiling, approximate	20,000 ft.

Capacity

Total cargo volume	1750 cu. ft.
Total passenger capacity	90

There also is an external door high up on the left side of the plane near the tail which gives direct access to the upper compartment. Passenger entrance to the main hold is through a lower door on the left side, located just forward of the main loading ramp.

Loading Ramp—The loading ramp is a thick, built-up structure consisting of a 17 x 9 ft. outer section and two inner sections which measure about 8 x 3 ft. When lowered the ramp has a slope of about 35 deg. When retracted, the ramp ramp closes up the bottom half of the loading aperture.

The upper half of this opening is covered by access doors which also enclose the ramp extension. These four sections in the tailboom interior. Doors and ramps are operated by a separate, centrally-located hydraulic system.

Flight Deck—The flight deck is designed for a crew of three and is split into two compartments. Entrance is through a door well behind the pilot's seat which opens to a ladder in the rear

cargo compartment directly below. Access to the ladder from the outside is through a lower door on the left side which opens into the forward cargo compartment.

Except for engine gauges mounted in the outer instrument panel, nose-wheel steering pedals on the left side, and switches on the outer console, all controls and instruments are duplicated for the pilot and co-pilot. Auto-pilot controls and instrument landing equipment are duplicated on the outer console.

Normally, steering is done with the nose-wheel steering pedals while controls are gas-braked. When locks are engaged, throttles cannot be opened all together beyond the running position, but they can be opened singly or in pairs, to maneuver the plane.

Control Surfaces—While elevator, aileron and rudder trim tabs normally are operated by control wheels located outboard of each seat, elevator can also be reversed rapidly by electric push-button on the "V" shaped control column handle.

All flight controls are hydraulically boosted with only a small part of the load transmitted to the pilot. The boost ratio is reported to be as high as 16:1. Seats are stressed for forward acceleration up to 25 G's.

In the aft compartment, separated from the cockpit by a bulkhead and curtains, the navigator and radio operator sit back-to-back, in a double seat on the left side with a rest back opposite. The navigator's station is designed to provide for installation of cloud and ceiling viewing, radar equipment.

Wing Structure—The modified R4F 34 wing is built in four parts: two outer sections mounting power plants, four feet long; 7.0 ft. 8' long, 8' long, 8' long, and flaps, and two outer panels carrying ailerons and designed to provide additional, installation of two fuel tanks in the wing.

A front spar is located at 25 percent chord and a rear spar at 55 percent.

Conventional construction is used with dual skin structure forward of the front spar. Skin is stiffened here by a corrugated inner skin, while closely spaced stringers and cross-braces are used aft of the front spar. Majority of the skin is the pressed flange type.

Slotted Flaps—The two 19-ft. NACA slotted flaps have a total area of 432 sq. ft. and are operated electrically. They are synchronized and are moved by a total of 6 actuators, each capable of a maximum stroke of 30,000 lb. ft. At cruising speed, the flaps are in the outer actuator but each flap is directly driven by a 4-hp motor with the one on each side linked to the center one by torque shafts.

Not Retractable—The inboard landing gear on the Universal is non-retractable. Main wheels are moved by means of

legs attached to the underside of the wing. These legs are braced by struts extending from the sides of the fuselage at the bottom. The nose wheel is a center through 125 deg. and is turned by means of a Lockheed hydraulic steering unit which is powered by the craft's 2800-gal. system. It is actuated by a control on the center console, all controls on the left side of the cockpit.

The Universal is powered by 4 Bristol Hercules 703 engines driving 14-ft. dia. Rotol four-bladed, reversible pitch props. Thrust per engine is 2000 hp at 2600 rpm.

Landing Gear Fires Studied by CAA

A study to develop more exact data on landing gear fires and to establish the best procedure for handling these fires was undertaken recently by the Civil Aeronautics Administration Technical Development and Evaluation Center, Indianapolis.

It is the practice of some pilots, when confronted with such an emergency, to apply pump fluid after the plane has come to a stop to contain the flame until ground fire extinguishing equipment can be brought into play.

How Much Heat?—Little has been known, however, about the fire flow speed required for most effective results, how long pump fluid can be safely used, and what other factors are involved in fire.

To find out, CAA set up a complete EC-3 landing gear in the first chamber at the Center, where the Lockheed Constellation XM-61 powerplant installation is also undergoing fire tests.

The Pratt & Whitney R-4330, having a 161-hp propeller, housed the air blast fans. A spark ignited the diesel fuel flowing under 500 psi pressure at a rate of 1.5 gals. per min. The leading gear was loaded 11½ ft. aft of the prop and 21 ft. to left of the centerline of the XM-61 nacelle.

The investigation was divided into two parts:

- Air flow measurements adjacent to the landing gear.
- Study of fire patterns in connection with air flow.
- Study of the durability of a landing gear.
- Measuring Air Flow—The apparatus for measuring airflow at various points in the nose plane, the skirt rimmed of a measuring duct extending out from the front of the skirt to which attached copper tubes for measuring air flow. The burner could be moved to the full length of the skirt. The tube ends were spotted at selected points on the Universal in the tailboom to record total head pressure. They were

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connected to a multiple water manometer for which was followed against static air pressure in the test chamber.

Air flow readings were taken at each 6-in. level, from a height above the flow corresponding to the center line of the leading pin, wind to the full exposed height of the wheel.

It was found that high speed air leaving the propeller moves inward like a continuous cylinder having a slightly larger diameter than the prop. Outside the bounds of this cylinder, the air speed is relatively lower and in some areas reversed.

Pinning Line—On completion of the air-speed survey, and after some of test, was conducted in which pins were spaced at various locations along the length of the strut. When the fire at the particular point under observation appeared to be under control, the air speed was noted. Pins were continued to be under control when they were reduced to a size that prevented damage to surrounding structure (A "burnproof" for hole like a large ball attached to the forward side of the steel and tin).

Arranged required to control three fires ranged around 60 to 80 mph. The fire alternately could be blown out when engine speed was increased to 7800 rpm (140 mph air flow speed at the strut).

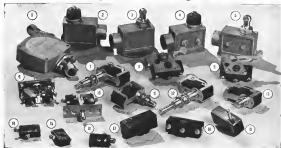
Tire Test—To determine how long an inflated tire could be subjected to this heat and constant impact, a wheel equipped with a tire and tube inflated to 45 psi was set in contact position on the continuous flow. The static hydraulic spray nozzle used to pyrolyze tests was attached to the rim of the wheel. When fluid flowing from the nozzle was ignited, the flames impinged on the tire, indicated through holes near the center of the wheel, and enveloped nearly half the tire.

No air blast was used as this test, but a 15 mph wind which was blowing at the time performed a similar function. The tire sustained impact for 2 min. 164 sec. Flames occurred near the head of the tire and was accompanied by a definite explosion.

As a result of these tests, GAA engineers have concluded:

- Average safe air speed required to control leading pin fire is about 75 mph at the pin.
- A speed of 78 mph is easily obtainable with prop located directly ahead of leading pin.
- Pins can be blown out consistently by a very strong blast of air.
- Size of the dehydrated length of time burning has no serious impact, but it can be expected to rupture within 2 to 5 minutes.
- It is highly dangerous for exposed personnel to approach any object more than 25 ft to a burning tire prior to the time it explodes.

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- 1 MICRO type LMR stoppage bearing with rotary type roller arm actuator, supplied without switch element, or with 4V3210 or 4V3211 element, and with or without ground strap. Conforms to 4V3210 1, 2, 3, 4, 5 and 6.
- 2 Lightweight, rugged, aluminum-bodied switch with sealed plunger (MICRO RE-175NT1), hot contact design, conforms to 4V3217-2.
- 3 Aluminum-bodied switch (MICRO RE-175NT1) with sub-miniature roller plunger actuator, hot contact design, conforms to 4V3217-2.
- 4 Lightweight, rugged, aluminum-bodied switch with sealed plunger (MICRO RE-175NT1), hot contact design, conforms to 4V3217-2.
- 5 Aluminum-bodied switch (MICRO RE-175NT1) with sub-miniature roller plunger actuator, sub-miniature design, conforms to 4V3217-2.
- 6 Momentary pressure (pop-out) single switch assembly for alternately opening and closing intercom (MICRO RE-175NT1) Conforms to 4V3217-2.
- 7 Actuator bracket (MICRO MC3211B) conforms to 4V3210-4. For use with single-pole double-throw basic switch (MICRO RE-175) which conforms to 4V3210-4 and with split contact double-throw switch (MICRO RE-175T) which conforms to 4V3210-4.
- 8 Lever arm actuator bracket that has provision for retaining the body switch while actuator is in depressed (MICRO RE-175NT1) Conforms to 4V3210-4. Mechanical design (MICRO MC3211B) conforming to 4V3210-4 also available. For use with MICRO basic switch (MICRO RE-175 and RE-175T, which conforms to 4V3210-4 and 4V3210-4, respectively.
- 9 Roller lever actuator bracket (MICRO AD521B) conforms to 4V3210-4. For use with single-pole double-throw switch (MICRO RE-175) which conforms to 4V3210-4 or with

split contact double-throw switch (MICRO RE-175T) which conforms to 4V3210-4.

Momentary pressure (pop-out) single switch assembly for actuating 1-in. diameter 3/4-in. diameter. Actuator assembly with switch conforms to 4V3210-2 (MICRO RE-175T). The MC3210 V2 2 switch in the assembly conforms to 4V3210-2.

11 Actuator bracket (MICRO MC3211B) conforms to 4V3210-2. Designed for use with MICRO single-pole, double-throw basic switch (RE-175) which conforms to 4V3210-2 and with MICRO split contact double-throw basic switch (RE-175T) which conforms to 4V3210-2.

12 Actuator bracket (MICRO MC3211B) conforms to 4V3210-2. For use with MICRO single-pole double-throw basic switch (RE-175) which conforms to 4V3210-2 and MICRO split contact double-throw basic switch (RE-175T) which conforms to 4V3210-2.

13 Actuator bracket (MICRO MC3211B) conforms to 4V3210-2. Designed for use with MICRO double-pole double-throw basic switch (RE-175) which conforms to 4V3210-2 and MICRO split contact double-throw basic switch (RE-175T) which conforms to 4V3210-2.

14 Small, compact MICRO V2-21 normally-closed switch conforms to 4V3210-2.

15 Small, compact MICRO V2-21 normally-open switch conforms to 4V3210-2.

16 Small, compact MICRO V2-21 double-throw switch conforms to 4V3210-2.

17 Split contact double-throw "pin" plunger basic switch (MICRO RE-175T) conforms to 4V3210-4.

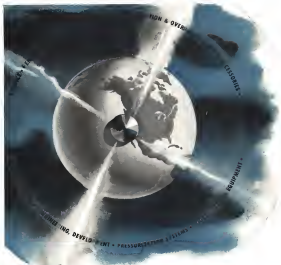
18 Single-pole double-throw "pin" plunger basic switch (MICRO RE-175T) conforms to 4V3210-4.

19 Single-pole double-throw "pin" plunger basic switch (MICRO RE-175T) conforms to 4V3210-4.

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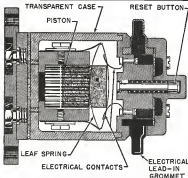
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EQUIPMENT



SWITCH is actuated by piston. When piston moves forward (shown shaded) it snaps leaf spring to bridge electrical contacts. In off position, spring is lowered back.

Simplified Crash Fire Switch

U. S. market now being offered new design of device long used in Britain to actuate fire prevention systems.

Several major airlines and engineers of the Civil Aeronautics Administration are evaluating a new fire prevention crash switch being tested for production by Sennswood Associates, Inc., Tarrytown, N. Y.

The new switch features the latest improvements in crash prevention crash switch being tested for production by Sennswood Associates, Inc., Tarrytown, N. Y.

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These crash switches, now standard equipment in British military and civil aircraft, may be one reason that as recent years Britain's crash fire record was developed by the world's leading producer of this type equipment.

Conover Mfg. Co., Ltd., England Sennswood has obtained sole rights to produce these units in the United States.

These crash switches, now standard equipment in British military and civil aircraft, may be one reason that as recent years Britain's crash fire record was developed by the world's leading producer of this type equipment.

At crash impact, it will electrically actuate fire extinguishing equipment, fuel and oil cutoff solenoids, battery output switches, signaling devices and other equipment needed in such an emergency.

How It Works—In this switch, the actuating piston remains in held in the set position by a low spring. At deceleration of 3 G or more, compression of the weighted piston overcomes the holding effect of the low spring, causing the spring to snap forward and bridge a

set of electrical contact points to operate required circuits.

Reset button and electrical connections are readily accessible by removing a metal cover at the front end of the switch. Pressing the button snaps the steel spring and returns the piston. Features of the spring and piston can be determined visually, the body of the switch being transparent.

Two transparent grommets protrude from the front cover in lead-in protection for electrical connections. The 12-ga. nut is 1/4 in. long and is provided with a 24-in. square pad across mounting base 6 in. mounting holes.

Other Switches—Sennswood is not the first company in the U. S. to produce switches based on Conover patents. Walter Kilde & Co., Inc., Belleville, N. J., has licensed and thousands of pendulum-type switch switches for actuating deactivating circuits to destroy IFF wire equipment in a crash.

A different approach to crash switch design is a novel development of another English firm, Calladon, Ltd. This is a "tangible" switch which consists essentially of a small glass cylinder containing a spring mechanism and visible electrical connections.

This unit is attached internally to the aircraft skin so that it fractures and completes the crash circuit when skin deformation at the area is greater than normally considered.

While Britain has enthusiastically adopted the crash switch to the extent of making its installation in aircraft mandatory, U. S. carriers have taken a decidedly more cautious approach.

These factors apparently influence fire attitude.

A fact that crash switches might operate at the wrong time.

The view that crash fires will be cut down appreciably only by obtaining basic causes for fire through changes in aircraft design.

Usefulness of a crash switch diminishes in proportion to the effectiveness of the fire extinguishing agent.

In answer to fears that such switches may operate in the wrong time, Jerome Lohrer, director of the Flight Safety Foundation, told Aviation Week that his group has received no reports from the British on premature operation of crash fire switches. He considers some models of this type may not have been reported.

Kilde says it has heard of no cases where IFF units have been inadvertently damaged since 1944, but there were several such incidents in the early stages of the war when status switches first were used with this equipment.

► **Good For New-It** will take time to become strongly supported design basis criteria for fire. The current view appears to be that the crash worthiness criteria for extinguishing equipment is a step in the right direction, even as the long run, means in encouraging the problem probably will depend on the use of highly effective, auto-actuating controlled crash systems—coupled with improved aircraft design.

While safety experts generally find that methyl bromide (CB) fire extinguishing systems are more effective and less costly than CO₂ equipment used by U.S. carriers, engineers point out that methyl bromide has the disadvantages of being highly toxic and corrosive in its normal state.

CB (CH₃Br) fire extinguishers, developed by the Germans and extensively tested by the Air Force, CAA and Kolls, reportedly has the superior fire extinguishing qualities of methyl bromide, but is considerably less toxic and somewhat less corrosive. Further, CB can be used in the same Kolls equipment now used for methyl bromide.

Military planes equipped with methyl bromide systems are the B-70, B-52, F-42, F-4C, F-105, and the Grumman SA-16A. F-400 Black Widows and the JRM Seas King have both during the war also used methyl bromide.

The Air Force has issued a specification on CB, and the entire AF aircraft fire extinguishing specification will be revised shortly to permit use of CB only. The Navy, on the other hand, will continue use of methyl bromide pending further investigation. Major producers of CB are Dow Chemical Co., Midland, Mich., and Michigan Chemical Corp., St. Louis, Mo.

Kolls says its methyl bromide (or CB) systems could be used effectively for automatic crash fire protection if crash studies were included.

► **British Express**—A persuasive bit of evidence in favor of automatic crash systems is Britain's impressive record since the mid of the war. Out of 34 four-engine civil plane crashes, 30 were not followed by fire. Anticipative action by the carrier indicates that if these were U.S. transports, chances are that as to 99 percent would have caught fire.

Information on what part German service includes coupled with methyl bromide systems played in the British record seems to be available.

In this connection, CAA is expected in August to submit to airlines and manufacturers a proposed recommendation that each engine and heater of all transports be provided with automatic extinguishing crash fire protection, to be actuated at a predetermined deceleration force.

► **UAL Week**—United Air Lines already has developed an outline sketch of its

own—but not for fire protection. This outline is designed to turn on flashlight located in the plane to indicate evacuation paths and exit points in a crash.

This unit is made with conventional right-angle flashlight mounted in special brackets. Each light has its own remote switch, adjusted to trip at a deceleration of 1.5 G and designed to be reset. All that is required to adjust this device to a flashlight is to remove the bottom pin assembly installed and screw in the new unit in its place.

With the remote control switch apparently performing flawlessly for the British, the trend toward adopting these units for crash fire prevention seems to be getting stronger. U.S. airlines are beginning to give time and money study to the crash switch.

NEW PRODUCTS DIGEST



Weather Aids

Line of down point indicators for airlines, airport and laboratory use have been developed by **Coat Research Laboratories**, 1457 Elmwood Pl., Chicago 14, Ill.

These instruments measure flow point or frost point in the air by inducing transparency of a small mirror surface which is controlled automatically in such a manner that a thin film of dew or frost of condense thickness is maintained on its surface at all times.

Type D-1 indicates can be used at airports or other remote ground locations such as weather towers. It can be left unattended and operates indefinitely.

Type D-2 (shown) has special power switch (pilot) to permit its use in aircraft. It will operate for 8 hours without refilling with coolant. Indicator designed for laboratory use is designated Type D-3. It is intended for indoor opera-

tion only and goes for 8 hours without refilling.

All three units operate on 110v, 60 cycle current, have a maximum of 50 in. Temperature range for D-2 and D-3 and 0 to -80 C to -40 C, while range for D-1 is -30 C to -40 C.



Fingertip Wrench

"Tooth 'N' Claw" fingertip wrenches, distributed by **Sigbee's**, Ottville, Pa., can be used in tight places and on delicate locations in aircraft to place and hold sets without jamming.

Wrench is made like a thumb and picks up set in hexagonal opening. It is made of nickel-plated steel and is supplied in sets of four to fit 1, 1/8, 1/4 and 1/16 inch sets. Made at F. K. Redfield Co., Danvers, N. J.

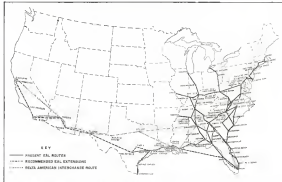


Lightweight Motor

A small 1/30 hp. motor produced by **Minico Electric Mfg. Co.**, 152 W. Colorado St., Pasadena 1, Calif., has an efficiency rating of 70 percent and weighs 9 oz.

Unit is designed to conform to Air Force Specification 32950. It operates on 115v, 50hz, 60c current. Motor has diameter of 2 in. and length of 1 1/2 in. Power ratings up to 2 hp. are available in the same basic diameter, motor says.

AIR TRANSPORT



FIFTH TRANSCONTINENTAL ROUTE, this one for EAL, is recommended by a CAA examiner to link Miami and the West Coast.

EAL a Step Nearer in Coast-to-Coast Bid

Examiner recommends routes be pushed west from San Antonio with restrictions to protect existing lines.

Eastern Air Lines will become the fifth transcontinental trunkline if the Civil Aeronautics Board follows the recommendations of one examiner. In his report on southern routes to the West, Examiner J. Earl Cox has argued that EAL's routes be extended from San Antonio to San Francisco, Oakland via El Paso, Tucson, Phoenix, San Diego and Los Angeles. He also recommended that the American Airlines-Delta Air Lines equipment interchange, which now provides one-stop service between the southeastern states and the West Coast, be approved on a permanent basis.

The proposed new links would add 2325 more miles to EAL's system, making it almost as large as United's but smaller than American's. Eastern already has a large domestic system, then the two transcontinental trunklines—Northeast and TWA. Eastern would need about twice additional Constellation to service the new routes.

Cox called for detail of American's bid for new routes between Los Angeles and San Francisco, between El Paso, San Antonio, Houston and New Orleans, and between Dallas, Houston and New Orleans. He also argued extension of Houston, Cincinnati, Delta and Northwest to New Orleans-California links.

► **Reiter Review Needed**—The examiner and the public conference and recently require establishment of better service from such southern cities as Miami, New Orleans, Houston and San Antonio to California. He emphasized, however, that Eastern should not be permitted to engage in unrestricted competition with American, TWA and United for the New York, West Coast market. The report suggests safeguards to protect such competition.

With the new extension, EAL's charter flights connect New York-Los Angeles (twice via Charlotte) would be 194 miles longer than a transcontinental run via Chicago and

would afford an comparable international route presenting cost, Cox said. But to be sure that the impact of EAL's New York-California competition would be light, the examiner recommended that all of Eastern's transcontinental flights between the West Coast and Richmond, Va., or points south thereof (Boston, New York, Philadelphia, Washington, etc.), be required to serve at least three points between El Paso and Richmond.

► **Division Foes and Cox**—Cox and his proposed restrictions should protect EAL from encroachment on the transcontinental potential of American, TWA and United. "If even with such limitations, Eastern could attract any large share of New York-California business, it would be a reflection on the adequacy of the service offered by the three established carriers," he declared.

American, which has the most to lose by EAL's transcontinental competition, estimated it would be subject to \$75,728,000 worth of annual traffic diversion if the new service were CKE. TWA has a possible diversion totaling \$15,794,680 and United \$18,179,008.

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Nearly five percent of Eastern's new through traffic would be diverted from their service, according to American. But Cal contends that in view of its proposed restrictions these figures are unrealistic. He says they present an extreme possible diversion based on the assumption that EAL could compete in all effectively for transatlantic traffic from the Northwest to the West Coast.

Besides the restrictions on EAL's through transatlantic service, Cal would protect competing carriers by guaranteeing Eastern's route operating double hops between San Diego, Los Angeles and San Francisco and by having service to El Paso and San Antonio on the main flight.

► **No Safety Hike**—The carrier's report asserts that Eastern's transatlantic service could be conducted without increased cost to the government in the form of mail pay to EAL as any other carrier effected by the new route. Eastern President J. V. Ricketts, in seeking the new line, offered to operate it without any subsidy mail pay.

Cost and competition between EAL's new transatlantic service and the American/Delta DC-4 interchange at PL Worth/Dallas demand serious high level of efficiency and public service by both operators. The AA Delta outgoings were inaugurated last September on a temporary basis pending CAA's decision on the southern transatlantic route case.

► **Interchanges Inaugured**—The report shows a modified lack of confidence for current interchanges as a means of providing faster service connecting airline transportation. This, Cal believes is particularly true where route deficits in service are involved—as on the southern transatlantic route. CAA members will study this phase of the report closely since, during recent years, they have expressed hope that interchanges could keep new domestic route certifications in a rock-bottom minimum.

Eastern's coast-to-coast agreement would be conducted initially with Constellation. Suggested schedules call for five roundtrips daily to the West, three of which would originate in Miami and two in New York.

Domestic Traffic Up But Earnings Down

The 16 scheduled domestic airlines showed all traffic records during the first half of 1959, but earnings during the second half of the period fell below the 1958 level.

While fuel costs for May and June are not available, it is apparent that domestic airline passenger and cargo

business in these two months was nothing short of spectacular in some cases, carriers had to switch around for enough equipment to handle peak periods of mail and passenger sailing lists reappeared.

Costs of a Northwest Airlines DC-4 as much as Lake Michigan June 24 did not have serious nationwide effects on the traffic level, although some loss of business from cities in areas closed to the accident was considered inevitable. One carrier reported a few passengers shifting their reservations from its coach to first-class flights after occurrence of the accident.

During the first quarter of 1959, passenger business was up 9 percent over the same 1949 period. In April the gain was nearly 11 percent. Even better results, especially on the transatlantic terminal business, are expected when all figures are in for May and June.

► **World Record Set**—American Airlines again broke all records for the weekend passenger miles flown in one month by a single carrier, beating its own mark set in June, 1949. AAN's passenger mileage soared 12.3 percent over the same month last year, and its load factor was 68.1 percent.

The carrier's May freight ton mileage edged 22.7 percent ahead of May, 1949, cargo traffic gained 3.1 percent, and mail 15.1 percent. American's transatlantic revenue was up 46.4 percent of capacity during the month, carrying 6209 passengers.

American, United and TWA all reported record traffic during the first three weeks of June.
United and passenger business on June 18 was the best in its history. TWA's transatlantic passenger traffic from June 18-16 was 13.5 percent ahead of the same period last year and reached an all-time high. Average load factor on all TWA flights in the record week was 79.2 percent, with the coast-to-coast coach flights running at 91 percent of capacity.

► **Fuel**—Downside-able, average reports were less gloomy. The 16 domestic airlines finished the first four months of the year with a \$3,150,000 operating loss, compared with a \$337,000 operating loss in the same 1949 period. Although revenues gained 5.6 percent, expenses jumped 6 percent.

The industry was pulled to the brink by the end of May, but May and June of 1949 were also unusually profitable. Even with record traffic there are some doubt that the \$10,460,000 operating profit shown at the end of third-half 1949 could be equaled this year.

Big losses in the earnings decline was Northwest Airlines. During the first four months of 1959, NWA had a \$4,168,000 operating deficit on its domestic services. In the same period last year, it lost only \$4,220,000.

► **Strike Recovery**—American has come back with a bang after a comparatively poor first quarter, when it was held by strike. It showed a \$1,517,000 operating profit in April, compared with \$4,193,000 in the same month last year. AAN's profit was also expected to be well ahead of 1949.

Other domestic carriers doing better financially in the first four months of 1959 than in the same period last year were Republic, Capital, Delta, Eastern, Mid-Continent, National, TWA, United and Western. Republic North west, those losing ground profitably in closed Chicago & Southern, Colonial and Northeast.

Save Time On Capital Super DC-3s

An agreement between Douglas Aircraft Corp. and Capital Airlines will help the carrier get its new Super DC-3s into service faster.

Three weeks prior to delivery of the first Super DC-3 to Capital, Douglas is leading that airline the engineering assistance usually. Capital will then be able to conduct with a minimum of lost time and expense all of its proving runs by City L Association. Administration and its flight crew training.

When the first Super DC-3 is delivered to mid-July, it will directly be necessary to finish its out and put into service," L. H. Goldwell, Capital's chief engineer, said.

Capital will have its complete fleet of their Super DC-3s by mid-August and plans to put them into service as Capital's "Tobacco Road," from Washington to Norfolk and Memphis. The route has 14 stops with average hops of about one hour.

BOAC Optimistic

British Overseas Airways Corp. believes it is no longer carrying around weight into its competitive fight for traffic.

► **Stales Thorens**, BOAC chairman, says his company is now a "lean, hardy and efficient organization with a high power-weight ratio." Since April 1958, he declares, 47 percent of its high order baskets have been dropped from the parcel. Total personnel is 17,700 for the merged BOAC and British South American Airways Corp., compared with 24,464 for BOAC alone in 1949.
► **Productivity Scan**—Capacity too miles produced per engine hour from 3005 in 1947-1948 to 7190 in 1949-50. Recent advance traffic bookings on the highly competitive North Atlantic are now double those of the same period last year.

The chairman attributed BOAC's substantial advance for the past year to

- **Seeding evaluation**.
- **Use of trade aircraft** on South American routes after Tatum were withdrawn from service.
- **Tuning crews for new transports**. But the carrier is already showing an increase in its maintenance of modern, personnel, landings such as in Canada for other flying hours.
- **Boeing Help**—BOAC reports steady improvement in on-time performance on its 41 transatlantic New York-London service. In May, for the third straight month, not one flight over the route was cancelled at either terminal.

The British carrier hopes to have its mail service increased daily. St Miles said that if BOAC were paid at least per ton for carrying mail in its principal American outposts as secured on transatlantic flights between January and September, 1949, his company's normal would have been increased by about \$5,520,000.

Stakes are High in Mail Rate Cases

Airlines have \$220,257,000 at stake in mail pay increase cases now pending before the CAB, according to their tabulation submitted to the Senate Appropriations Committee.

The most exact payments for the calendar year 1958 through 1958, CAB reported total amounts sought by categories of carriers, as follows: domestic mail lines, \$116,975,000; feeder lines, \$12,583,600; international carriers, \$723,000. American carriers, \$1,094,000, and international carriers, \$102,975,000.

LAI Will Fly North Atlantic Route

Another European flag carrier is preparing to start scheduled operations over the hilly cooperative North Atlantic routes.

The Italian company, Linee Aeree Italiane, has received a license to operate part from the Civil Aeronautics Board. LAI hopes to start weekly Rome-New York DC-6 service on July 15, leaving London to twice weekly in August. Intermediate stops will be at Dublin, Amsterdam, Elst, Gander, Newfoundland, and Boston.

► **Control Share**—TWA, the U. S. flag carrier, has been given a 40 percent share in the LAI but takes no active part in managing the Italian carrier. The Italian government controls 40 percent of LAI's stock, private Italian companies hold the remaining 20. LAI has been operating a domestic Italian service since early 1947, but has extended its routes to London, Tunis, Athens, Alexandria and Tel Aviv. It may also operate a link to

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Stockholm via Munich and Frankfurt, Germany.

The Italian carrier has three 43-passenger DC-6s on order from Douglas, with delivery expected this summer and fall. Pending their arrival, LCI will use two DC-6s loaned from Douglas for training and initial operations.

Vacation Air Travel Cost \$164 Million

Airline firms accounted for about 18 percent of all transportation expenditures for vacation travel during the 12-month period ending May, 1949, according to a nationwide survey conducted by the Curtis Publishing Co., Philadelphia.

The study shows that out of total revenue for national transportation of \$3,790,926,000, the share for U.S. airlines was \$194 million. This compares with the airlines' share of \$420 million for 1948 and 1947.

The impact of air travel service on the vacation travel market is not reflected in the study. Air coach activity didn't reach significant proportions until after May, 1949—having been present only about six months before when Capital Airlines initiated low-cost "Nighthawk" service between New York, Pittsburgh and Chicago.

While airlines ranked third—after automobiles and schools—in amount

spent for vacation transportation, they dropped to fourth place in a previous survey. In 1948, they made during vacation period, 79.5 percent was by automobile, 12.7 by railroad coach, 10.3 by bus, 5 by railroad Pullman, and 5.4 by airline. Sight-seeing accounts accounted for 3.1 percent of total trips, followed by ocean ship trips with 0.2 percent. Total exceeds 100 percent because many families and more than one method.

Percentage of total vacation trips by all methods by season was winter, 11.5; spring, 12.5; summer, 49.9; fall, 26.1. And of total trips during each season, sight travel accounted for winter, 3.8 percent; spring, 5.4; summer, 2.4; fall, 5.5.

About two million trips, or 4.6 percent of total, were outside the U.S., with Canada the nation most traveled for visiting.

CAB Closes Capital Colonial Studies

Civil Aeronautics Board has closed its three-year-old investigations into the business, routes and operations of Capital Airlines and Capital Air Lines which had among its findings: The Federal agency said it was too busy to handle the cases in the way it had begun to handle.

The investigation was begun during March and April, 1947, together with similar studies of Chicago & Southern Air Lines, Northeast Airlines and Western Air Lines. CAB staff members made field studies of the carriers, and the transportation bureau has submitted special reports to the Board.

Financial Crisis Cited—But to many emergency mail runs were taken place during the industry's financial crisis in 1947 and 1948 that CAB's limited staff was unable to complete work on the investigations, except in the case of Chicago & Southern. Because the data obtained in the Capital and Colonial probes is now too old, the proceedings have been closed.

The Northeast and Western investigations were relayed by CAB early in 1949, and these cases will remain open.

Jury Clears Pilot In Seattle Crash

Pilot of an Alaska Airlines DC-4 that crashed at Seattle-Tacoma Airport in November, 1947, killing nine persons, has been cleared by a Federal jury of CAA charges that he operated his plane in a "careless and reckless manner."

But pilot James E. Farris was found guilty of attempting manslaughter without landing at nearby Boeing Field before the accident. The al-

tempted landing at Boeing Field was made when rain was below CAA minimums. A \$1000 fine had been asked by the government on this charge. The jury recommended a \$1000 fine.

Post Landing—Government attorneys charged that Farris landed at excessive speed and tail-dragged the runway of Seattle-Tacoma Airport. (The Civil Aeronautics Board's official report on the accident had made similar findings.) Farris maintained he did his best to make a safe landing, despite engine problems, poor visibility and defective brakes. The government and the investigation after the crash showed no evidence of mechanical failure.

Sierracin Panels

Capital Airlines will have Sierracin panels installed in both the main and outer windows of the five Model D49 Constellation sets to be delivered by Lockheed Aircraft Corp. This installation is expected greatly to increase the safety of the aircraft's windows.

SHORTLINES

► American—President C. R. Smith says his company has no general intention of buying other airlines or enlarging

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LARGEST FEEDER

Reaching from the Eastern Airlines coast to Chicago, Frontier Airlines' newly added short-haul network will serve 47 towns in seven states where no full operation. The airline's 400-ton routes is larger than the domestic route of any transline between California, Connecticut, New York, Mid-Continent, National, Northeast and Western.

transport. He feels that while jet engines have "great possibilities" they must become more reliable and economical. "If we were using jets today we would have to increase fares, whereas we are trying to lower them," Smith thinks it will be "around five years" before jet planes are flying on scheduled airlines.

► **American Overseas**—Has inaugurated a new four-day-a-week internal German air service between Hamburg and Berlin.

► **Boeing**—Flight traffic set new company records in May, with domestic cargo increases up 50 percent and international cargo increases up 153 percent over the same month last year.

► **British European Airways**—Is now carrying dollar-free American passengers enroute to England and Europe—at the rate of \$1,250,000 a year. B.E.A.'s passenger traffic in April was 15 percent ahead of the same month last year, and revenues were better than budget estimates.

► **California Control**—Has sold one 15-passenger DC-3 to Hawaiian Airlines for use under chart to Paris Air Lines. The California institute line will replace the DC-3s with DC-4s.

► **Civil Aeronautics Board**—Has suspended letters of suspension held by three large carriers for failure to file quarterly flight reports. Nonetheless alerted are Eastern Airways, New

York, Golden Airways, Manhattan Beach, Gold, and Skyway International Trading & Transport Co., Miami. . . A firm of management engineers has begun a \$25,000 efficiency study of C.A.B. and will attempt to streamline the agency's work.

► **Confair**—C.A.B. has placed in effect new rules which designed to wipe out C.A.L.'s 1949 losses and to prevent profitable operations this year (Aviation Week June 19).

► **El Al Israel National Airlines**—Has received a temporary foreign air carrier permit from C.A.B. authorizing service from Israel to New York for a one-year period. The government-owned carrier has four DC-4s and has hired 25 American as a nucleus for its flight and maintenance staff.

► **Flying Tiger Line**—Flight traffic on the carrier's scheduled transcontinental system totaled 5 million ton miles during the six months ended Apr. 30—representing a 15 percent gain over the same period the year before. President Robert W. French predicts even better results during the present six-month period. The company is operating 19 domestic stations compared with six a year ago, and has more than doubled its fleet.

► **KLM**—Reports a loss of 39.5 million guilders (over \$10 million) in 1949 compared to a profit of 173,000 guilders in 1948. Most of the deficit was incurred on the Amsterdam-Dutch East Indies route. Loss will be covered by the Dutch government, but the assistance is being granted on condition of drastic cutbacks.

► **National**—Expects delivery of two of its new DC-6s by the end of July, with the others two expected in December.

► **Pan American**—Made 55 DC-4 flights from Puerto Rico to Michigan in eight days carrying 3160 Puerto Ricans to school in order to help the Eastern Air Lines also participated in the emergency relief program by the same crash of a non-scheduled Western Transport C-46 and the Puerto Rican government's cancellation of further non-scheduled flights.

► **Pascan**—Carried 38 percent more passengers in the first six months of 1950 than in the same period last year.

► **Shen**—Flew 2,001,712 revenue ton miles of freight in May and believes it holds even on its constant carrier business. Volume was up almost 500,000 ton miles over April, and load factor rose from 67.5 to 75.4 percent. Shen was successful bidder on a contract to overhaul 209 Air Force engines.

► **TWA**—Is seeking C.A.B. approval of an interchange agreement which would provide through-line service between points west of Albuquerque on TWA's transcontinental route and points south and east of Albuquerque on Continental Air Lines' routes into Texas. TWA has put one of its Boeing Stratocruisers on stage after nearly 13 years and 25,000 h of service. First of 12 leased Martin 2-02As to be delivered early this month.

► **Western**—Has asked C.A.B. for a 53rd rule "loosening link" from Salt Lake City to Rapid City, S. D., via Casper, Wyo. It would permit WAL to operate direct flights from Los Angeles to Minneapolis-St. Paul.

CAB SCHEDULE

July 10—Reinstatement of application of American "Q" and Composite Carriers to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 11—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 12—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 13—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 14—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 15—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 16—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 17—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 18—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 19—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 20—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 21—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 22—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 23—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 24—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

July 25—Reinstatement of application of American passenger airlines to Airline route between Washington-New York foreign air carrier permits. (Aviation Week June 11)

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Wider Publicity for Contracts

Industry and the public will gain from wider dissemination of information about military purchasing, announced by the Department of Defense.

As reported more fully on our issue of last week, names of firms awarded Army, Navy, and Air Force contracts of \$25,000 and over will be available weekly through 1200 Department of Commerce field offices.

The three services will prepare a weekly synopsis of awards of unclassified, negotiated and formally advertised contracts.

For almost two years, one of the planks in Antonow Warco's editorial platform has been wider publicity for purchasing information. It was only 20 months ago that the Air Force was ordering announcement of virtually all of its negotiated contracts. Only a few were released. Since negotiated contracts already are larger than contracts publicly bid for, it meant that an important percentage of the public dollars spent by the Air Force with individual firms in industry were never publicly accounted for.

American West finally went to the then Secretary for Air, W. Stuart Symington, who subsequently ordered all unclassified negotiated contracts made available not only to this magazine but to the press generally. We have been publishing this information ever since.

The Defense Department deserves congratulations on this making vital business and industry information freely available to those who need it. It is also, of course, in the best interests of the military services themselves to play all of their procurement cards on top of the table all the time. That is one sure way to stifle rumors of graft.

Handouts or Security?

The headlines say Congress agreed on a 70-grip Air Force. Actually, the lawmakers said they wouldn't approve anything bigger than that. It's the "grip" or "grip strength" of the Air Force. The truth is, they will appropriate annual sums to support a force anywhere below that top limit. It's all very confusing, but you see, politicians like to have their cake and eat it too.

Congress removed all vestiges of a provision for annual procurement of new aircraft. They also knocked out a stipulation that would have authorized the Air Force to procure 5200 new planes, or 42,500 engine lots, every year.

So we have no national policy that interests our maintaining a healthy and adequate aircraft industry to fall back on in case the Russians become intolerable—which may mean almost anytime.

Our legislative willer points out that 70 percent of the 13,000 serviceable planes the USAF has were damaged before 1949.

A few days before the Korean implementation broke out, Mr. Truman and we cannot afford a 70-grip air force, only about 80 grips. This force is decimated by our military losses in weekly wars.

But new legislation looks certain authorizing another

two billion dollars to purchase surplus farm products. We already spend more money every year on grain, supporting peasants, than we do on parked missiles. We now propose to throw away still another couple of billion on handouts, while we hold down our Air Force. What could be better news for the Russians?

Abolishing the Races

So they've canceled the National Air Races for 1950. That is good for aviation. It might save lives, too. We doubt if these races are ever held again, at least in the form we all know them. We hope the 1949 band is gone forever.

The final blow to this year's event was Secretary Johnson's order to the Air Force and Navy to stop out.

The crash of popular pilot Bill Odom's plane into a house, killing him and two occupants of the house, dropped a pall over last year's spectacle. It also shocked the show management into reducing the terrible risk they were taking, every year in permitting, even encouraging, high speed, races and stunts to take place over the heavily populated Cleveland area.

There may have been a time when the Cleveland race contributed something to the technical progress of aviation. If ever there was such a time, it is long since past. The great industry and government labor forces and wind tunnels, and the gaudy flight test programs, have taken over in an impressive style, necessarily in confidential secrecy.

Nothing was left for Cleveland but a sort of Roman holiday after that was a moment to human life and a congenial place for aviation people to get together and hang out while they paid no attention at all to the race.

Commercial aviation's whole future depends on wide public acceptance. That acceptance depends on public confidence in the present and potential safety of commercial flying. Such acceptance is growing rapidly. But despite the fact that the National Safety Council gives inflated figures a better safety rate than the private auto and truck, public acceptance of the commercial airplane still lags far behind that of the garden variety auto.

As long as it does lag behind the car, we certainly cannot afford the luxury of any Roman holidays like the National Air Races in the reckless manner to which they are accustomed.

There are still too many good, potential customers of the airline who to this day associate non-commercial air accidents with commercial air safety. One reason for this, of course, is a national program of information and education. Another is to stop airlines' stunts at air shows and news conferences about having at least that one type of airplane accident, anyhow.

When we get the masses to the point where they stop believing that the airplane—any airplane—is inherently unsafe, then perhaps we can put on a thrill show like the National Memorial Day race at Indianapolis. But aviation has not yet reached that enviable stage. Let's help get it there as soon as possible.

—Robert H. Wood

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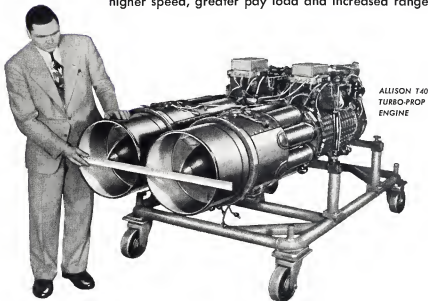
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